

CLAIMS

5 1. A de-skew system comprising:
 processor configured to receive input data and generate
parallel data;

 de-skew unit receiving the generated parallel data and a
timing signal and adjusting timing of the generated parallel
10 data, based on the timing signal, to generate a plurality of
data signals; and

 control unit configured to collect portions of the
plurality of data signals and to receive a loop data sample and
generating the timing signal based on a comparison of the
15 collected portions of the plurality of data signals and the loop
data sample.

 2. The system of claim 1 further comprising:

20 buffer unit receiving the plurality of data and a clock
signal and generating a plurality of data signals based on the
received clock signal; and

 reverse control unit configured to collect portions of the
plurality of data signals and to generate a loop data sample
25 based on the collected portions of the plurality of data
signals.

 3. The de-skew system of claim 2 further comprising input
30 drivers receiving input data.

 4. A de-skew method comprising:
 receiving a loop back data sample;
 determining a data channel specified by the loop back data
35 sample;

 determining a delay for data from a specific channel when

the determined data channel is the specific channel; and
 5 delaying data from the specific channel by the determined
 delay.

5. The method of claim 4 wherein determining a delay
 comprises:

10 providing data from the specific channel to a delay
 element; and

 comparing data from the delay element with the data from
 the loop back data sample.

15 6. The method of claim 5 wherein delaying the specific
 channel comprises adjusting the delay time of the delay element
 when the data from the delay element corresponds to the data
 from the loop back data sample.

20 7. The method of claim 4 further comprising setting the
 specific channel at a midpoint.

25 8. The method of claim 5 further comprising selecting
 another channel to supply data to the delay element.

30 9. The method of claim 4 further comprising comparing
 data from the loop back data sample with the delayed data from
 the specific channel when the determined data channel is the
 specific channel.

35 10. The method of claim 9 further comprising selecting
 another channel based on the comparison of the data from the
 loop back data sample with the delayed data.

11. The method of claim 9 further comprising:

determining a delay for the specific channel based on the comparison of the data from the loop back data sample with the delayed data; and

adjusting the delay of the specific channel.

12. A method of deskewing parallel data lines comprising:

providing parallel data over a plurality of parallel data lines, the parallel data lines providing parallel data from a first unit to a second unit;

successively providing sample data over a sample channel, the sample data corresponding to data of the parallel data, the sample channel providing sample data from the second unit to the first unit; and

using the sample data to align the parallel data.

13. A system including deskew functions comprising:

an upstream unit providing parallel data to a downstream unit over parallel data channels;

a downstream unit receiving the parallel data from the upstream unit over the parallel data channels;

a sample channel coupling the upstream unit and the downstream unit, the sample channel carrying samples of the parallel data, the sample channel carrying samples of the parallel data from the downstream unit to the upstream unit.

14. The system including deskew functions of claim 13

wherein the downstream unit includes a sampler for placing samples of data from a selected parallel data line on the sample channel.

15. The system including deskew functions of claim 14
 5 wherein the upstream unit includes a deskew circuitry for each
 of the parallel data channels.

16. The system including deskew functions of claim 15
 10 wherein the upstream unit includes control circuitry providing
 adjustments to the deskew circuitry based on a comparison of
 portions of the parallel data and data provided over the sample
 channel.

17. A system of two units coupled by parallel data lines
 15 comprising:

a first unit providing parallel data over N parallel data
 lines;

a second unit receiving the parallel data over the N
 20 parallel data lines;

a spare channel in parallel with the N parallel data lines,
 the first unit providing data of the parallel data lines over
 the spare channel, the second unit receiving the data of the
 parallel data lines over the spare channel;

a return channel in parallel with the N parallel data
 25 lines, the second unit providing data of the parallel data lines
 over the return channel, the first unit receiving the data of
 the parallel data lines over the return channel; and

at least one unit in the first unit deskewing the N
 30 parallel data lines using data of the parallel data lines
 received over the return channel.

18. The system of two units coupled by parallel data
 35 lines of claim 17 wherein the second unit includes a selector
 for replacing data from a selected one of the N parallel data

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lines with data from the spare channel.

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